What is Claimed:

1. A method of tuning a wavelength tunable electroabsorption modulator (EAM), comprising the steps of:

a) providing a reference average power loss factor for light having a reference peak wavelength that is modulated by the wavelength tunable EAM, the reference average power loss factor based on operation of the wavelength tunable EAM using a reference bias voltage, a reference temperature, and a reference modulation signal having a predetermined duty cycle;

b) optically coupling the input light beam into the wavelength tunable EAM;

c) modulating light within the wavelength tunable EAM using a modulation signal having the predetermined duty cycle;

d) measuring an input power of light provided to the wavelength tunable EAM and an average output power of light emitted from the wavelength tunable EAM to generate an average power loss factor;

e) comparing the average power loss factor to the reference average power loss factor; and

f) adjusting at least one of a bias voltage and a temperature of the wavelength tunable EAM to reduce differences between the average power loss factor and the reference average power loss factor, thereby tuning the wavelength tunable EAM.

2. The method of claim 1, wherein the predetermined duty cycle is 50%.

3. The method of claim 1, wherein step (c) further includes the step of initially setting the bias voltage of the wavelength tunable EAM to the reference bias voltage and the temperature of the wavelength tunable EAM to the reference temperature.

4. The method of claim 1, wherein step (f) includes the steps of:

f1) decreasing the bias voltage of the wavelength tunable EAM when the average power loss factor is greater than the reference average power loss factor; and

f2) increasing the bias voltage of the wavelength tunable EAM when the average power loss factor is less than the reference average power loss factor.

5. The method of claim 1, wherein step (f) includes the steps of:

f1) decreasing the temperature of the wavelength tunable EAM when the average power loss factor is less than the reference average power loss factor; and

f2) increasing the temperature of the wavelength tunable EAM when the average power loss factor is greater than the reference average power loss factor.

6. The method of claim 1, wherein step (f) includes the steps of:

f1) adjusting the temperature of the wavelength tunable EAM to provide coarse control the average power loss factor when the average power loss factor and the reference average power loss factor exhibit an absolute difference that is greater than about .5dB; and

f2) adjusting the bias voltage of the wavelength tunable EAM to provide fine control the average power loss factor when the absolute difference between the average power loss factor and the reference average power loss factor is less than about .5dB.

7. The method of claim 1, wherein:

step (a) includes the step of selecting the reference peak wavelength from a plurality of reference wavelengths such that the reference peak wavelength is closer to an operational peak wavelength of the light provided to the EAM than other reference wavelengths of the plurality of reference wavelengths;

step (c) further includes the step of setting the temperature of the wavelength tunable EAM to the reference temperature; and

step (f) is the step of adjusting the bias voltage of the wavelength tunable EAM to substantially equalize the average power loss factor and the reference average power loss factor.

8. A method of tuning a wavelength tunable electroabsorption modulator (EAM), comprising the steps of:

a) providing a reference average output power for light that is modulated by the wavelength tunable EAM, the light having an input power and a reference peak wavelength, and the reference average output power based on operation of the wavelength tunable EAM using a reference bias voltage, a reference temperature, and a reference modulation signal having a predetermined duty cycle;

b) optically coupling an input light beam into the wavelength tunable EAM, the input light beam having approximately the input power and an operational peak wavelength;

c) modulating light within the wavelength tunable EAM using a modulation signal having the predetermined duty cycle;

d) measuring an average output power of a modulated light beam emitted from the wavelength tunable EAM;

e) comparing the average output power determined in step (d) to the reference average output power; and

f) adjusting at least one of a bias voltage and a temperature of the wavelength tunable EAM to reduce differences between the average output power and the reference average output power, thereby tuning the wavelength tunable EAM.

9. The method of claim 8, wherein the predetermined duty cycle is 50%.

10. The method of claim 8, wherein step (c) further includes the step of initially setting the bias voltage of the wavelength tunable EAM to the reference bias voltage and the temperature of the wavelength tunable EAM to the reference temperature.

11. The method of claim 8, wherein step (f) includes the steps of:

f1) decreasing the bias voltage of the wavelength tunable EAM when the average output power is greater than the reference average output power; and

f2) increasing the bias voltage of the wavelength tunable EAM when the average output power is less than the reference average output power.

12. The method of claim 8, wherein step (f) includes the steps of:

f1) decreasing the temperature of the wavelength tunable EAM when the average output power is less than the reference average output power; and

f2) increasing the temperature of the wavelength tunable EAM when the average power loss factor is greater than the reference average power loss factor.

13. The method of claim 8, wherein step (f) includes the steps of:

f1) adjusting the temperature of the wavelength tunable EAM to provide coarse control the average output power when average output power and the reference average output power exhibit an absolute difference that is greater than about .5dB; and

f2) adjusting the bias voltage of the wavelength tunable EAM to provide fine control the average output power when the absolute difference between the average output power and the reference average output power is less than about .5dB.

14. The method of claim 8, wherein:

step (a) includes the step of selecting the reference peak wavelength from a plurality of reference wavelengths such that the reference peak wavelength is closer to the operational peak wavelength than other reference wavelengths of the plurality of reference wavelengths;

step (c) further includes the step of setting the temperature of the wavelength tunable EAM to the reference temperature; and

step (f) is the step of adjusting the bias voltage of the wavelength tunable EAM to substantially equalize the average output power and the reference average output power.

15. The method of claim 8, wherein:

the input power of the light used in step (a) is such that the wavelength tunable EAM is saturated by the light;

step (b) further includes the step of amplifying the input light beam in a semiconductor optical amplifier to increase an optical power of the input light beam to approximately the input power before it is coupled into the wavelength tunable EAM.

16. A method of tuning a wavelength tunable electroabsorption modulator (EAM), comprising the steps of:

a) optically coupling an input light beam into the wavelength tunable EAM, the input light beam having an operational peak wavelength;

b) modulating light within the wavelength tunable EAM using a modulation signal having a 50% duty cycle;

c) measuring a modulated light beam emitted from the wavelength tunable EAM to generate an eye diagram for the modulated light beam;

d) determining an optical eye crossing point for the modulated light beam from the eye diagram generated in step (d); and

e) adjusting at least one of a bias voltage and a temperature of the wavelength tunable EAM such that the optical eye crossing point equals approximately 50%, thereby tuning the wavelength tunable EAM.

17. The method of claim 16, wherein:

step (b) further includes the step of initially setting the bias voltage of the wavelength tunable EAM to a reference bias voltage and the temperature of the wavelength tunable EAM to a reference temperature; and

the reference bias voltage and the reference temperature are selected such that the optical eye crossing point equals 50% for modulation by the wavelength tunable EAM of light having a reference peak wavelength.

18. The method of claim 17, wherein step (e) includes the steps of:

e1) decreasing the bias voltage of the wavelength tunable EAM from the reference bias voltage to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is greater than the reference peak wavelength; and

e2) increasing the bias voltage of the wavelength tunable EAM from the reference bias voltage to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is less than the reference peak wavelength.

19. The method of claim 17, wherein step (e) includes the steps of:

e1) decreasing the temperature of the wavelength tunable EAM from the reference temperature to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is less than the reference peak wavelength; and

e2) increasing the temperature of the wavelength tunable EAM from the reference temperature to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is greater than the reference peak wavelength.

20. The method of claim 16, wherein:

the operational peak wavelength of the input light beam is within one wavelength range of a plurality of wavelength ranges, the plurality of wavelength ranges forming an operational bandwidth of the wavelength tunable EAM;

step (b) further includes the step of initially setting the bias voltage of the wavelength tunable EAM to a reference bias voltage and the temperature of the wavelength tunable EAM to a corresponding reference temperature for the one wavelength range which includes the operational peak wavelength;

the reference bias voltage and the corresponding reference temperature are selected such that the optical eye crossing point equals 50% for modulation by the

wavelength tunable EAM of light having a corresponding reference peak wavelength, the corresponding reference peak wavelength being within the one wavelength range which includes the operational peak wavelength; and

step (e) includes the steps of;

e1) decreasing the bias voltage of the wavelength tunable EAM from the reference bias voltage to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is greater than the corresponding reference peak wavelength; and

e2) increasing the bias voltage of the wavelength tunable EAM from the reference bias voltage to adjust the optical eye crossing point to approximately 50% when the operational peak wavelength is less than the corresponding reference peak wavelength.